Nidhi Khiantani

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EDUCATION

Duke University | Bachelors of Science in Computer Science and Theater Studies, ECE focus **May 2026**
Relevant Coursework: Digital Systems, IoT Systems, Electrical and Computer Engineering Fundamentals, Advanced Data Structures and Algorithms, Product Design, Computer Systems, Discrete Math

TECHNICAL SKILLS

Hardware Design & Testing: PCB Design (KiCad), FPGA Development (Vivado), Circuit Design, Oscilloscope, Logic Analyzer, Multimeter, Soldering, Hardware Debugging, Testing & Validation, Signal Processing
Embedded Systems & Firmware: Arduino, ESP32 (S2/S3), STM32, Raspberry Pi, Jetson AGX Xavier, Nexys A7 FPGA
Protocols & Interfaces: I2C, SPI, UART, PWM
HDL & Programming: Verilog, C/C++, Python (NumPy, Pandas, PyTorch), Java, MATLAB, MicroPython, Assembly
Software & Development Tools: Git, Linux, ROS2, Flask, Node.js, HTML/CSS, Google Cloud, Figma, CAD (Onshape)

PROJECTS

WavGuard Balance Board

- Engineered an ESP32-based smart wakeboard that delivers real-time LED balance feedback for beginner riders using an algorithm that maps foot-pressure ratios to visual cues
- Designed custom PCB in KiCad consolidating 16+ connections (8 FSR sensors, BNO055 IMU, OLEDs) with proper trace routing and power distribution
- Validated the system using FEA to simulate riding forces; presented at an engineering showcase

CPU-Controlled Ice Cream Topping Machine

- Architected 5-stage pipelined CPU in Verilog deployed on Nexys FPGA board at 25Mhz clock frequency
- Validated pipeline through comprehensive testbench with 90% pass rate and integrated CPU design using Vivado simulation
- Programmed FSM for motor control via PWM signals and 9-button encoder interface for topping selection

Matchamatic IoT DrinkMaker

- Designed an ESP32-based automated matcha system with a 4-channel relay module controlling peristaltic pumps and DC motors, reducing drink preparation time by 50%
- Built a MOSFET voltage step-up circuit to drive dual DC motors for matcha whisking and cold foam frothing; integrated 3D printed motor mounts and whisk modules
- Programmed a MicroPython-based web server with Flask for recipe customization, managing GPIO control logic for precise liquid dispensing and motor actuation

EXPERIENCE

Hardware Engineer Intern | *Autonomous Vehicle Lab, A&T University* | 04/2025 - 07/2025

- Integrated a Jetson AGX Xavier, 2D LiDAR, and an Intel RealSense camera on an small autonomous vehicle, interfacing an Arduino Mega with dual DC motors through ROS2
- Implemented a real-time sensor fusion pipeline combining LIDAR point clouds and RGB camera data for <1s obstacle avoidance and lane following
- Collected and annotated a 3000+ image dataset to fine-tune the YOLOP model for indoor navigation

Full-Stack Engineer | *DroneWQ Desktop App* | 08/2025 - 12/2025

- Built a full-stack Python+Electron application processing 1000+ multispectral drone images for water analysis, reducing manual data processing time by 90%
- Programmed the backend data pipeline with Flask APIs, developed Python modules for environmental metrics, and shipped the image-processing engine as a PyPI package (https://pypi.org/project/dronewq/0.1.1/)

Data Science Intern | *Hickey Lab: Pan-Organ Analysis of Spatial-omics* | 08/2023 - 12/2023

- Automated collection and analysis of 50+ human tissue spatial-omics datasets using Python scripts, reducing manual processing time by 80%
- Developed Gaussian mixture and K Nearest Neighbors (KNN) machine learning algorithms incorporating spatial framework of data, improving clustering accuracy by 20%

Technical Manager, Actor | *Duke Players* | 08/23 - Present

- Directed technical operations and stage management for 3 productions, coordinating lighting and sound
- Developed and launched a website (dukeplayers.com), increasing show attendances and improving marketing and online ticket sales

Founder and Tutor | *Step To Success Tutoring Program* | 08/2020 - Present

- Created a community tutoring program of over 30 tutors serving 100+ students tutored across Asheboro, NC
- Designed a curriculum of 50+ resources and coordinated technology access for low income students